

FABRICATION OF INTEGRATED DEVICES USING NITROGEN
IMPLANTATION

09/397952

Abstract of the Disclosure

5 A process is provided for forming an isolating nitride film to isolate gate
polysilicon of a gate structure. Specifically, the process comprises providing a
channel region defined by a source and drain region of a semiconductor substrate
having a gate structure comprising an isolating oxide layer positioned on the channel
region and the polysilicon layer positioned on the oxide layer. More specifically, the
process comprises the steps of forming the nitrogen implanted regions over the
10 semiconductor substrate by implanting nitrogen atoms into those regions and growing
spacers from exposed portions of the polysilicon layer. During the spacer growth, the
spacer grows vertically as well as laterally extending under the polysilicon edges.
Diffusion of nitrogen atoms to the substrate surface forms silicon nitride under the
gate edges, which minimizes current leakages into gate polysilicon.

ASA-2590
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[HNY-1106.3
021397]